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ABSTRACT

The Resiliency Scale (C. Jew, 1992) is a recently developed measure intended to assess an individual's level of three facets of resiliency (optimism, skill acquisition, and risk-taking). Separate exploratory factor analyses with three diverse groups have led to definition of subscales bearing some similarities. In this study, items comparable across the three variations of the scale intended for use with three age groups (adults, 9th graders, 7-12th graders) were identified. This paper reports results of the attempt to explore the stability of the structure of resiliency across age groups as well as across gender. The ninth grade sample consisted of 408 students. Another sample consisted of 392 students in grades 7 through 12, and the third sample was 304 college students. A 17-item, 3-factor model was found to be at least partially invariant between the 9th grade and the 7-12th grade data sets. In addition, analyses suggested that the structure of the resiliency scale was dramatically different for females as compared to male respondents. Results are discussed in light of developmental and identity differences. An appendix lists the three factors. (Contains 2 tables and 27 references.) (Author/SLD)

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Confirmatory Factor Analysis of the Resiliency Scale

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Abstract

The Resiliency Scale (Jew, 1992) is a recently developed measure intended to assess an individual's level of three facets of resiliency (optimism, skill acquisition, and risk-taking). Separate exploratory factor analyses with three diverse groups have led to definition of subscales bearing some similarities. In this study, items comparable across the three variations of the scale intended for use with three age groups (adults, 9th graders, 7-12th graders) were identified. This paper reports results of the attempt to explore the stability of the structure of resiliency across age groups as well as across gender. A 17-item, three factor model was found to be at least partially invariant between the 9th grade and the 7-12th grade data sets. In addition, analyses suggested that the structure of the resiliency scale was dramatically different for females as compared to male respondents. Results are discussed in light of developmental and identity differences.

Resiliency, a construct originally described in the 1950s, has been conceptualized as a personal characteristic that helps individuals adapt to stressful and maltreatment situations (Block & Kremen, 1996; Cowen & Work, 1988; Egeland, Sroufe, & Erickson, 1983; Garmezy, 1981; Garmezy & Nuechterlein, 1972; Steele, 1987). Resilient individuals overcome negative early environments and severely stressful life circumstances to flourish as children or adults. These people have been referred to as survivors, invulnerable, invincible, and resilient.

Resiliency is frequently termed a personal characteristic, a developmentally-tied attribute, or a reflection of a transitory balance between risk and protective factors. By some, resiliency is considered to be constitutionally based, but affected by both genetics and environmental factors, and thus changes somewhat over time in interaction with the environment (Lazarus & Monat, 1991; Mrazek & Mrazek, 1987; Rutter, 1985; Zimrin, 1986). Responses to stress are influenced by appraisal of the situation and by a person's capacity to process the experience, attach meaning to it, and to incorporate the experience into his/her belief system. This conceptualization of resiliency implies it to be a mutable characteristic, dependent upon life's vagaries as well as individual predispositions. Highly stable levels of resiliency, then, would be unlikely in the face of changing life circumstances (e.g., Cicchetti, Rogosch, Lynch, & Holt, 1993).

The stability of resiliency over time has received little direct attention. Klohen (1996) proposes that the same characteristics forming ego resiliency found in children are likely to be found in adults. Bradley et al. (1994) argues that, conceptually, early resiliency should be predictive of resiliency later in life. Zimrin (1986) also considered age as a variable likely to affect resiliency, though it is unclear what the proposed effect is.

van Aken (1996), van Lieshout, Haselager, Riksen-Walraven, and van Aken (1995), and Block (1987, 1993) provide empirical data addressing the stability of resiliency. van Aiken followed 100 children from ages 7 to 20 and found no significant long-term stability for resiliency but significant prediction of short-term personality consistency from resiliency. He used a sample of firstborn children of lower class Dutch families. van Lieshout et al. (1995) report moderate stability of resiliency from ages 7 to 12 for the same sample. Block studied 130 American children from ages 3 to 23, and found consistency in ego resiliency from childhood through adolescence for boys. He found general stability of resiliency during childhood and during adolescence through young adulthood for girls, but a shift in resiliency between the two developmental phases. That is, for girls early resiliency did not relate to later resiliency. He assessed resiliency with a structured interview. Block and Kremen (1996) found considerable stability in an inventory measure of resiliency from age 18 to 23 ($r = .51$) for the 49 females in the study and less consistency ($r = .39$) for the 46 males. Considering the results of all their studies, they proposed that "girls during their adolescence and young adulthood manifest more psychological restructuring of their adaptive modes than do boys, who continue into these years with much the same personalities established earlier" (p. 353).

In concert with Block's (1993) finding of different stability reliability of the resiliency construct over time for girls and boys, one questions whether the construct differs structurally across gender as well, showing different mean levels, different internal consistency reliabilities, and different factor loadings. Girls and boys experience different socializing customs and normative expectations. For example, perceptions of the normative value of independence may differ for boys and girls, and may relate structurally less and more strongly to social skills and

social awareness. Clark (1995) suggests we have evidence of gender differences in environmental stressors, especially in adolescence, and decries the paucity of information available about gender differences in risk and protective factors.

In addition to a lack of information about when, why, and how resiliency changes over the life span, the construct itself has not been defined in a clear manner nor are there standard measures to assess it. In the most extensive study of resiliency to date, Werner (1989) and Werner and Smith (1982) found resilient children to possess the following characteristics: higher levels of autonomy, independence, empathy, task orientation, curiosity, and better problem solving skills and peer relationships than their less resilient peers. Mrazek and Mrazek (1987) identified 12 skills and abilities they found to be associated with level of resiliency: rapid responsivity to danger, precocious maturity, disassociation of affect, information seeking, formation and utilization of relationships for survival, positive projective anticipation, decisive risk-taking, the conviction of being loved, idealization of aggressor's competence, cognitive restructuring of painful events, altruism, and optimism and hope. Rush, Schoel, and Barnard (1995) identified control, commitment, and challenge as components of resiliency. Valentine and Feinauer (1993) identified themes of belief in self, spiritual belief, external attribution of blame, internal locus of control, and the ability to find supportive relationships (in this instance, outside of the family) in her work interviewing divorced, adult women. Rak and Patterson (1996) define resiliency as including active problem solving, optimism, the ability to gain positive attention, a perception of life as meaningful, the ability to be autonomous, interest in novel experiences, and taking a proactive perspective. Klohnen (1996) found four distinct facets in ego resiliency: confident optimism, productive and autonomous activity, interpersonal

warmth and insight, and skilled expressiveness. Wright (1996) also explicitly includes social competence as part of a definition of resiliency, along with problem-solving skills and a sense of autonomy. The concepts common to these and other studies include a sense of life purpose or optimism, independence or risk-taking, social competence, and task-related skill acquisition.

While there has been little consensus on a definition of resiliency and a lack of clarity regarding whether it is a stable personality trait, there have been attempts to assess level of resiliency. The four mechanisms for assessing resiliency used in previous research are observation (Werner, 1989), structured interview (Block, 1987; Rak & Patterson, 1994; Valentine & Feinauer, 1993), parent and teacher rating of children's resiliency (Eisenberg et al., 1997), and self-report paper and pencil measures (Block & Kremer, 1996; Jew, 1991; Klohnen, 1996; Kysela, 1996). Klohnen distilled a 29-item measure of resiliency from the 472 items comprising the California Psychological Inventory (Gough, 1987) and evaluated the reliability, internal structure, and discriminant and convergent validity of the measure for two samples of adult women. Jew (1991) developed a 65-item measure for use with ninth graders. She subsequently revised the measure for use with 7-12th graders and also generated a version for use with adults (Jew & Green, 1995, 1997). Jew's resiliency measure was developed in accord with the work of Mrazek and Mrazek (1987). Adaptations of this measure for use across varied age ranges make it the most suitable for use in the present study.

The present study addressed the structure and stability of resiliency, as conceptualized by Jew (1991) for three cohorts reflecting the span of early adolescence to adulthood. Three existing data sets were employed in this investigation and are described in detail below. The primary limitation to this work was the lack of consistent items used with the three samples.

While similar facets of resiliency were assessed, the specific items used to assess them varied, with a minority of items retaining their exact phrasing across the three samples. A second purpose of this study was to determine whether the structure of the measure was similar for males and females across the age cohorts.

Method

Data Sets

Sample 1: Ninth Graders

This sample is comprised of 408 (49% male and 51% female) ninth grade students enrolled in a suburban high school in a Western state. The average age was 14. The majority of the district's students are Caucasian with approximately 20% minority; the community is socioeconomically lower to middle class.

A 60-item resiliency measure (Jew, 1991) was given to students to complete in a single administration in their social studies class in November, 1989. The first author read the informed consent letter which students signed if they chose to participate. Students had 90 minutes to complete the measure and were asked to write their names on the form.

Principal components analysis of the 60-item measure suggested four subscales to account for item intercorrelations. Jew (1991) termed these subscales optimistic orientation (15 items, alpha = .82), future orientation (10 items, alpha = .70), other person awareness (6 items, alpha = .66), and independence (6 items, alpha = .66).

Sample 2: Seventh to Twelfth Graders

This sample is comprised of 392 7-12th grade students from a rural Western school district. The area is agricultural, with a predominantly Euro-American population. Most

participants came from a two-parent family of lower to middle socio-economic class. Just over half (51%) of the sample was male, with 49% female; ages ranged from 12 to 18 (M = 14.8, SD= 1.7).

A 48-item resiliency measure and a data sheet asking for information about age, gender, grade, family structure, and past disturbing events such as death in the family, parental divorce, drug use, abuse, and trouble with police was administered in January, 1994 (pretest). Students were released from class to complete the forms in a single session.

The 48-item measure was a revision of Jew's (1991) earlier scale. Principal components analysis with varimax rotation resulted in identification of three subscales called active optimism (18 items, alpha = .92), passive optimism (11 items, alpha = .82), and belief in others (19 items, alpha = .83) (Jew & Green, 1995).

Sample 3: Adults

This sample is comprised of 304 students (128 males and 176 females) enrolled in an introductory psychology course at a small private southern college. Ages ranged from 18 to 66 with a mean of 20.1 ($\underline{s}$ = 4.9); 64% were between 18 and 23 years of age.

A resiliency measure was constructed using the Jew (1991) 60-item scale and focus group comments as a basis. Items were revised, deleted, and added to generate a 50-item measure appropriate for adults. A data sheet soliciting information about age, gender, and past traumatic events (e.g., divorce, illness) was administered along with the resiliency measure. Data were collected in class in April of 1995.

A principal components analysis with varimax rotation was used with four subscales resulting. They were termed active optimism (14 items, alpha = .92), passive optimism (20

items, alpha = .96), social optimism (13 items, alpha = .95), and independence/risk-taking (3 items, alpha = .71). The first two subscales were conceptualy similar to those found for adolescents, but the third reflected elements of skill acquisition in a social context. The final brief subscale reflected items in the original resiliency scale (Jew, 1991) that were not present in the first revision.

Common Items

A common measure was constructed by comparing items from each of the three scales. Three criteria were used for item selection: 1) items that were both syntactically and semantically identical, 2) items that were both syntactically and semantically similar (but not identical), and 3) items that were semantically similar but syntactically different. Criteria 1 and 2 yielded a list of 24 common items. No additional common items were found using Criteria 3. Using this list of items, an exploratory factor analysis with oblique rotation was run using the 7th-12th grade data to examine the underlying factor structure. Four factors were produced; although upon closer examination, these factors were not conceptually coherent (i.e., the items loading on a particular factor did not seem to have much in common). In previous work with this scale, a three factor structure consisting of active, passive, and social optimism had been selected. Consequently, the common items were re-examined and sorted on these factors. To make certain that these items did correlate with each other, alpha reliabilities were calculated. Items with item-to-total correlations less than .4 were marked as candidates for removal from further analyses. In total, 2 items were dropped due to poor correlations with the other items, leaving a total of 22 items. The reliabilities for the factors were .75 for active optimism, .87 for passive optimism, and .78 for social optimism.

A confirmatory factor analysis was then run on the 7th-12th grade data to establish the appropriateness of this particular three factor model. As with most survey data, the Likert-type scaling of this resiliency questionnaire violated the homogeneity of variance assumption made when using maximum likelihood estimation methods. However, the current sample size was not sufficient to attempt weighted least squares estimation, a method more robust to heterogeneity of variance. Therefore, the covariance matrices were submitted to LISREL under maximum likelihood estimation. The initial solution was not satisfactory (χ^2 = 710.98, df=206; RMSEA=.087, NNFI=.79; CFI=.81), so the modification indices (MI) and expected parameter change (EPC) statistics were examined to determine if some minor re-specifications would improve model fit. Five items had large EPC's and MI's suggesting that if these items were permitted to cross-load on more than one factor, fit of the model would improve. However, making these modifications did not make substantive sense and did not result in significant parameter estimates on either factor. Hence, these five items were excluded from further analyses. The final model included 17 items and appeared to fit the data well (χ^2 = 312.11, df=116; RMSEA=.071, NNFI=.88; CFI=.90). A summary of the final 17 items is included in the Appendix.

The three-factor model was applied to the other two data sets—the ninth graders and the adults—to get a preliminary sense of the adequacy of this model. The three-factor model appeared to fit reasonably well for the ninth grade sample (χ^2 = 299.43, df=116; RMSEA=.066; NNFI=.85; CFI=.87), but did not appear to fit the adult sample well (χ^2 = 550.21, df=116; RMSEA=.11; NNFI=.86; CFI=.88). Furthermore, no simple modifications appeared to improve the fit of the model, suggesting perhaps, that the factor structure of this resiliency scale is

different for adults. In addition to the poor fit information, the format of the adult scale did not make it conducive to further cross-validation analyses. While the 9th grade and 7-12th grade scales have five response options, the adult scale has six response options. Such a discrepancy in response options would confound cross-validation attempts (even if the three-factor model had fit the adult sample) because of differences in variance and loading size. Consequently, cross-validation attempts were made using the ninth grade sample with the 7-12th grade sample as an anchor.

Experiment 1

Cross-validating this confirmatory factor analysis involved systematically testing the equivalence of the model both in terms of general form and in terms of specific parameters. In other words, invariance of a model across groups involves tests of both the similarity of the covariance matrices and factor structures on the lower end of the invariance continuum, and tests of parameter equality on the higher end of the invariance continuum (Bollen, 1989). An outline of the sequence and results at each stage are presented in Table 1. The steps in order of increasing restrictiveness were: 1) equality of the variance/covariance matrices, 2) plausibility of the factor structure, 3) invariance of factor loadings, 4) invariance of loadings and factor variances/covariances, 5) invariance of loadings, factor variances/covariance, and error variances/covariances, and 6) invariance of latent means. The invariance analyses were anchored on the 7th-12th grade data set for comparison against the 9th grade sample.

Results

In step 1, equality of the variance-covariance matrices was tested to make sure that there

were sufficient similarities between groups to merit further invariance testing. Upon examination of the appropriate fit indices, this condition was found to be met. The next step was to test the plausibility of the three-factor structure. While the chi-square difference test was statistically significant (indicating differences between groups), the other fit indices (RMSEA, NNFI, and CFI) suggested that the factor structure was plausible, so the invariance procedure was continued. The third step—invariance of factor loadings—produced results similar to the proceeding step. In fact, all six steps produced significant chi-square difference tests, but alternative measures of fit (including the ratio of χ^2/df, RMSEA, and CFI) fell within acceptable ranges, leading to the conclusion that there was evidence of at least partial invariance across groups. In other words, the assumption that this scale generalizes across samples is tenable.

Experiment 2

In order to determine if the factor structure of the resiliency scale was the same for males and females, the data were collapsed across the samples of 7-12th graders and 9th graders and separated by gender. Prior to conducting invariance tests on specific parameters, the model was run separately for males and females. Results of these analyses are presented in Table 2. The fit indices indicate that the model fits well for males but not for females. Possible model modifications were examined to determine if a fitting model could be produced. No modifications led to a fitting model for females suggesting that the structure of the resiliency scale was dramatically different for female respondents. Preliminary results of exploratory factor analyses indicate that there may be additional factors involved in female resiliency and this is consistent with previous findings (Block, 1993; Clark, 1995).

Discussion

Research on resiliency has flourised recently with descriptions of its characteristics as a psychological variable but with no consensus on a definition. Different approaches have been taken to measure this construct and several resiliency scales have been developed. The focus of the present paper was on an investigation of whether the latent variables underlying three existing scales covering different age levels could be integrated into one structural model. Differences by gender in scale structure were also studied. Analyses indicated that scale structure did generalize across two samples (9th and 7-12th graders) but not to the adult scale used. And, gender differences were identified with a clear consistent structure for males but an amorphous structure for females.

What literature exists addressing changes in resilience with age indicated some shifts may occur at different periods of development. Results of this study suggest that the resiliency construct may fail to retain its definition across stages of development. It is also possible that the construct definition is stable but that the indicators (items) vary with developmental stage. Furthermore, shifts may occur at different ages for males than for females and may be more pronounced for one gender than for the other.

Implications of these findings come in use of the scales for further research on resiliency and for clinical appraisal of individuals. If used for research for the purpose of investigating differences between groups, age level is a consideration. Longitudinal studies using data from the same individuals may provide fruitful information about the stability of resilience over time. Items which are descriptors suitable for a wide age range will need to be identified for such a longitudinal study. Data sets will need to be analyzed separately by gender as well.

When used clinically, the gender and age of the client is also a concern. Clinical use of a scale implies that norms are available and that the measure is defined as stable, at least within some boundaries. The relationships of resiliency to other psychological variables must be clarified to fully profit from a resiliency measure.

Resiliency has emerged as an important component of human functioning and merits study in greater depth. The current study has extended our knowledge of the structure of some existing resiliency measures and has suggested directions for future work.

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Table 1
Invariance of the 3-Factor Model

Model	χ^2 / df	$\Delta\chi^2$	Δdf	RMSEA	NNFI	CFI
Initial						
7-12th grade (sample 1)	312.11/116	--	--	.071	.88	.90
9th grade (sample 2)	299.43/116	--	--	.066	.85	.87
1. Global	372.79/153	--	--	.045	.88	.93
2. Structure	611.55/232	238.76	79*	.048	.87	.89
3. Loadings	646.04/246	34.49	14*	.048	.87	.88
4. Phi	669.00/252	22.96	6*	.049	.87	.87
5. Residuals	769.42/269	100.42	17*	.052	.85	.85
6. Latent Means	1419.54/283	649.77	14*	.076	.96	.96

* $p < .05$ level

Table 2
Fit of the 3-Factor Model for Boys and Girls

	χ^2 / df	RMSEA	NNFI	CFI
Boys	285.97/116	.066	.890	.870
Girls	505.92/116	.098	.760	.710

Appendix

Factor 1 - Skill Acquisition*

_ Respond quickly to danger

_ learn about new experiences

_ recognize dangerous situations

_ read to be prepared for anything

_ belief in ability to make personal dreams come true

_ control how events will affect individual

_ taking risks can be worthwhile

Factor 2 - Optimism*

_ Life is good

_ good attitude about life

_ hope for the future

_ happy with my life

_ belief in ability to deal with future

Factor 3-Belief in Others*

_ Someone other than a family member loves me

_ pleasure out of giving to others

_ significant person in life who's helped a lot

_ ability to see others in times of need

_ always help others who can't help themselves

* Please note that items listed do not represent the original items used, but only the concepts underlying them.